AMENDMENTS TO THE CLAIMS:

Please amend claims 21, 35, 37, 40, and 42, and add new claims 43-52, as indicated below. This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1.-20. (Canceled)

21. (Currently Amended) A wavelength converter device for generating a converted radiation at frequency ω_g through interaction between at least one signal radiation at frequency ω_s and at least one pump radiation at frequency ω_p, comprising:

an input for said at least one signal radiation at frequency ω_s;

a pump light source for generating said at least one pump radiation at frequency ω_p;

an output for taking out said converted radiation at frequency ω_g; and

a structure for transmitting said signal and pump radiation, said structure including [[one]] an optical resonator comprising a non-linear material, having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g;

said structure comprising a further optical resonator coupled in series to said optical resonator, said further optical resonator comprising a non-linear material, having an optical length of at least $40* \lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and

converted frequencies ω_p, ω_s and ω_g[[;]], and wherein by propagating through said structure, the pump and signal radiation generate said converted radiation by non-linear interaction within each of said optical resonators.

22. (Previously Presented) The wavelength converter device according to claim 21, wherein the converted radiation is generated by four-wave-mixing.

23. (Previously Presented) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator each have an optical length lower than or equal to $7500*\lambda/2$.

24. (Previously Presented) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator comprise reflectors each having a power reflectivity of at least 0.5.

25. (Previously Presented) The wavelength converter device according to claim 21, wherein the optical resonator is a Fabry-Perot like cavity bounded by two partially reflecting mirrors.

26. (Previously Presented) The wavelength converter device according to claim 25, wherein the further optical resonator is a Fabry-Perot like cavity bounded by two partially reflecting mirrors.

27. (Previously Presented) The wavelength converter device according to claim 21, wherein the optical resonator is a micro-ring-like resonator.

28. (Previously Presented) The wavelength converter device according to claim 27, wherein the further optical resonator is a micro-ring-like resonator.

29. (Previously Presented) The wavelength converter device according to claim 21, wherein the optical resonator is formed in a photonic crystal waveguide.

30. (Previously Presented) The wavelength converter device according to claim 29, wherein the further optical resonator is formed in a photonic crystal waveguide.

31. (Previously Presented) The wavelength converter device according to claim 21, further comprising an additional structure in series to the structure.

32. (Previously Presented) The wavelength converter device according to claim 31, further comprising a phase mismatch compensating element adapted to compensate for the phase mismatch accumulated by the pump and signal radiation along the structure.

33. (Previously Presented) The wavelength converter device according to claim 32, wherein the phase mismatch compensating element is placed between the structure and the additional structure.

34. (Previously Presented) The wavelength converter device according to claim 32, wherein the phase mismatch compensating element comprises a material having a non-linear refractive index n2 lower than the non-linear refractive index of the material included in the structure and the additional structure.

35. (Currently Amended) A method for generating a radiation at frequency ω_g comprising[[,]]:

interacting through non-linear interaction at least one pump radiation at frequency ω_p with at least one signal radiation at frequency ω_s in a structure comprising a plurality of cascaded optical resonators ~~wherein said resonators comprise~~ each comprising a non-linear material~~, resonate~~ resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g, and [[have]] having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and wherein through said non-linear interaction the pump and signal radiation generate said converted radiation within each of said plurality of cascaded optical resonators.

36. (Previously Presented) The method according to claim 35, wherein the radiation at frequency ω_g is generated by four-wave mixing.

37. (Currently Amended) An apparatus for an optical network node, comprising:

a routing element with at least one input port and a plurality of output ports for interconnecting each input port with at least one corresponding output port;

at least one wavelength converter device for generating a converted radiation at frequency ω_g through interaction between at least one signal radiation at frequency ω_s and at least one pump radiation at frequency ω_p, comprising:

an input for said at least one signal radiation at frequency ω_s;

a pump light source for generating said at least one pump radiation at frequency ω_p;

an output for taking out said converted radiation at frequency ω_g; and

a structure for transmitting said signal and pump radiation, said structure including [[one]] an optical resonator comprising a non-linear material, having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g,

said structure comprising a further optical resonator coupled in series to said optical resonator, said further optical resonator comprising a non-linear material, having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g; wherein by propagating through said structure the pump and signal radiation generate said converted radiation by non-linear interaction within each of said optical resonators, and

said at least one wavelength converter device being optically coupled to one of the ports of said routing element.

38. (Previously Presented) The apparatus for an optical network node according to claim 37, further comprising an additional structure in series to the structure.

39. (Previously Presented) The apparatus for an optical network node according to claim 38, further comprising a phase mismatch compensating element adapted to compensate for the phase mismatch accumulated by the pump and signal radiation along the structure.

40. (Currently Amended) An optical communication line comprising an optical transmission path for transmitting at least one signal radiation at frequency ω_s, and a wavelength converter device for generating a converted radiation at frequency ω_g through interaction between said at least one signal radiation at frequency ω_s and at least one pump radiation at frequency ω_p, comprising:

an input for said at least one signal radiation at frequency ω_s;

a pump light source for generating said at least one pump radiation at frequency ω_p;

an output for taking out said converted radiation at frequency ω_g; and

a structure for transmitting said signal and pump radiation, said structure including [[one]] an optical resonator comprising a non-linear material, having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g,

said structure comprising a further optical resonator coupled in series to said optical resonator, said further optical resonator comprising a non-linear material, having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g; wherein by propagating through said

structure the pump and signal radiation generate said converted radiation by non-linear interaction within each of said optical resonators,

said wavelength converter device being optically coupled to said optical transmission path ~~for generating a radiation at frequency ω_g by non-linear interaction between at least one pump radiation at frequency ω_p and said at least one signal radiation at frequency ω_s~~.

41. (Previously Presented) The optical communication line according to claim 40, wherein the optical transmission path is an optical fiber length.

42. (Currently Amended) A method for altering the optical spectrum of at least one optical signal radiation at frequency ω_s ~~propagating through it~~ comprising, interacting by non-linear interaction [[of]] the optical signal radiation ~~within material of~~ with an optical pump radiation at frequency ω_p in a structure comprising a plurality of cascaded optical resonators each comprising a non-linear material, resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g, and having~~, wherein said optical resonators resonate at the signal radiation frequency ω_s and have~~ an optical length of at least $40*\lambda/2$, ~~wherein~~ λ being [[is]] the wavelength of the ~~optical signal~~ pump radiation, wherein the pump and signal radiation generate said converted radiation through said non-linear interaction within each of said plurality of cascaded optical resonators.

43. (New) The wavelength converter device according to claim 21, wherein the pump radiation frequency ω_p and the signal radiation frequency ω_s are different.

44. (New) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator are connected in series.

45. (New) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator are made of the same material.

46. (New) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator have the same optical length.

47. (New) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator each have a free spectral range equal to or lower than about 4 THz.

48. (New) The wavelength converter device according to claim 21, wherein the optical resonator and the further optical resonator each have a free spectral range equal to or lower than about 1000 GHz.

49. (New) The wavelength converter device according to claim 21, wherein a ratio FSR/B between a free spectral range FSR and a bandwidth B for the optical resonator and the further optical resonator is greater than or equal to 2.

50. (New) The wavelength converter device according to claim 21, wherein a ratio FSR/B between a free spectral range FSR and a bandwidth B for the optical resonator and the further optical resonator is less than or equal to 100.

51. (New) The wavelength converter device according to claim 21, wherein the structure further comprises a third optical resonator cascaded to the further optical resonator, said third optical resonator comprising a non-linear material having an optical length of at least $40*\lambda/2$, wherein λ is the wavelength of the pump radiation, and resonating at the pump, signal and converted frequencies ω_p, ω_s and ω_g, wherein by propagating through said structure the pump and signal radiation generate said converted radiation by non-linear interaction within each of said optical resonator, said further optical resonator and said third optical resonator.

52. (New) The wavelength converter device according to claim 21, wherein the structure comprises a number of cascaded optical resonators less than N_{max}, where N_{max} is equal to the ratio between the coherence length L_{coh} of the structure and the physical length d of each of said cascaded optical resonators.